Rec. @ meeting
11/6/13 by M. Warro

Novenber 5, 2013

Comments on the use of Geotubes for the "protection" of Baxter Rd.

Respectfully Submitted by:

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Seawalls are shore parallel structures designed to protect property from coastal erosion. Any structure that is designed to combat storm erosion by reflecting waves and surge is effectively a seawall. If a line of geotubes (geotextile, sand filled tubes) remains in tact during storm wave attack, then the geotubes are acting like a seawall and will have identical impacts. Many states have recognized this fact and codified it. Florida recognizes that geotubes fall into the same category as other types of coastal armoring:

> COASTAL ARMORING POLICY and GUIDELINES: Section 161.085, Florida Statutes and Chapter 62B-33, Florida Administrative Code.
> COASTAL ARMORING: A manmade structure designed to either prevent erosion of the upland property or protect eligible structures from the effects of coastal wave and current action. Examples include seawalls, revetments, bulkheads, retaining walls, sloped boulder revetments, sloped geotextile revetments, geotextile dune scour protection, or other similar structures.

So, one must keep in mind that if a wall of geotubes works as designed, that wall will have the same impacts as a seawall.

1) When placed on an eroding or retreating beach or bluff, geotubes will cause that beach to narrow and eventually disappear.
2) Erosion will be increased at the ends of the wall, the so-called "end effect." The end effect is the result of waves diffracting around the edges of the wall during storms or high water events. It results in a clear increase in erosion at the margins of the geotube wall.
3) The wall will eliminate the natural sediment supply that would come to the beach through erosion of the bluff behind the wall.

Hurricane Sandy provided multiple examples of neighboring properties impacted by geotube wall end effect.

NOAA high-resolution aerial image from Nov. 4, 2012 of Quogue, NY. The red arrows are pointing to sands deposited during storm overwash. This degree of storm penetration and overwash was not seen on properties to the west. It was unique to the property sitting right at the terminus of the geotextile wall.

Another property in the Town of Southampton that had increased storm energy and damage as a result of the end effect from a large geotextile wall sitting immediately to the east.

Geotubes may fail during a large storm creating multiple problems. The following is a history of a geotube installation along the Bolivar Peninsula of Texas. This account was presented by geologist Donald Owen, PhD at Lamar University :

> Geotubes, temporary seawalls or "sand socks" were installed along ~5 miles of the beach east and west of Rollover Pass during 2000-2001, with the stated purpose of "saving the beach" depleted by the Rollover Pass funnel. The geotubes quickly reduced beach width and steepened the offshore profile without the aid of hurricanes. This erosion was caused by the geotubes reflecting wave energy downward and offshore, causing sand removal
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> offshore and water deepening. Without the gently sloping, normal beach profile, large waves could then strike the geotubes during cold-front passages, tropical storms, or hurricane storm surge. When the storm surge rises above the height of the geotube (typically ~8 ft.), large storm waves pass over the geotube, without it absorbing much wave energy, and hit structures behind it. The abrupt shallowing at the geotubes can cause the waves to break on the geotubes rather than offshore, propelling fast-moving water directly onto beach houses, etc. close behind them. This occurred during Hurricane Ike, with a 20-foot storm surge, when all (>200) structures, except for one newly constructed home on high piers, were destroyed in Gilchrist between Highway 87 and the geotubes. Several people in Gilchrist died during Ike. Also, because the geotubes were breached, storm-surge backflow was concentrated at gaps, removing concrete slabs, and eroding channels several feet deep into beach sand and underlying compacted Pleistocene mud. Bolivar geotubes gave residents a false sense of security and enhanced destruction by Hurricane Ike's waves. West of the geotubes, a much higher percentage (~20%) of beach houses survived Hurricane Ike because there were no geotubes to enhance destructive effects along a normal, gently-sloping beach.
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> Five months after Ike, the geotubes have been removed, and the state has recommended closure of Rollover Pass.
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> http://www.lafayettegeologicalsociety.org/Owen.pdf

In short, there will always be unintended consequences and unpredictable impacts from any shoreline engineering installation. At Siasconset, a very high energy shoreline, the geotubes are likely to result in the same shoreline over-steepening documented in Texas. In a big storm, they will fail and cleaning them up will be problematic. Pulling geotextile fabric out of the sand after burial is no easy task. And, the Town will be responsible for all of the impacts and the clean-up. Finally, if they do happen to survive in tact for the duration of the temporary installation, good luck pulling them out. Property owners will not be happy that the Town is reducing their level of protection.